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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/555,559	05/31/2000	RICHARD ALLAN TUCK	670-1003	9227

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LEE MANN SMITH MCWILLIAMS  
SWEENEY & OHLSON  
PO BOX 2786  
CHICAGO, IL 60690-2786

EXAMINER	
QUARTERMAN, KEVIN J	
ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 09/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/555,559

Applicant(s)

TUCK ET AL.

Examiner

Kevin Quarterman

Art Unit

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 31 May 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-61 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-61 is/are rejected.
- 7) ☒ Claim(s) 60 and 61 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 May 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Drawings*

1. Figures 1a and 1b should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Reference sign "236" in line 24 of page 16 is not shown in any of the drawings.
3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Reference sign "214" of Figure 1b; reference sign "301" of Figure 3; reference sign "705" of Figure 7; reference sign "174" of Figure 13; and reference sign "2009" of Figure 15.
4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "402" and "413" have both been used to designate the insulating layer in Figure 4.
5. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### **Specification**

6. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

#### **Arrangement of the Specification**

7. As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or  
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.
- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

8. The disclosure is objected to because of the following informalities: The description lacks section headings, as described above. Figures 1a and 1b are not included in the Brief Description of the Drawings section as set forth in 37 CFR 1.74. Appropriate correction is required.

9. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

10. The following title is suggested: --FIELD ELECTRON EMISSION MATERIALS WITH INSULATING MATERIAL DISPOSED IN PARTICULAR AREA AND DEVICES--.

### ***Claim Objections***

11. Claims 60-61 are objected to because of the following informalities: It appears that the term "compromises" should be replaced with the term --comprises--. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1-61 rejected under 35 U.S.C. 103(a) as being unpatentable over Tuck et al. (USPN 6097139).

14. Regarding independent claim 1, Figure 5 of Tuck et al. shows a method of forming a field electron emission material comprising a step of disposing on a substrate

Application/Control Number: 09/555,559  
Art Unit: 2879

(24) having an electrically conductive surface a plurality of electrically conductive particles (26), each with a layer of electrically insulating material (25) disposed between the conductive surface and the particle and between the particle and the environment in which the field emission material is disposed.

15. Tuck et al. disclose the claimed invention except for the insulating material being disposed in only one of the above locations, not in both locations.

16. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the insulating material in only one of the above locations, since it has been held that omission of an element and its function in a combination where the remaining elements perform the same functions as before involves only routine skill in the art. *In re Karlson*, 136 USPQ 184.

17. Regarding claims 2-4, Tuck et al. disclose the dimension of the particles normal to the conductive surface being at least 10 times greater than the thickness of the insulating material (col. 3, ln. 42-45).

18. Regarding claim 5, Tuck et al. disclose the thickness of the insulating material being of the order of 10nm and the particle dimension being in the range of 0.1 $\mu$ m to 400 $\mu$ m (col. 3, ln. 46-51).

19. Regarding claim 6, Tuck et al. disclose a substantially single layer of conductive particles each having their dimension substantially normal to the surface in the range of 0.1 $\mu$ m to 400 $\mu$ m (col. 3, ln. 49-51).

20. Regarding claim 7, Tuck et al. disclose that the insulating material comprises a material other than diamond (col. 3, ln. 52-53).



Application/Control Number: 09/555,559

Art Unit: 2879

21. Regarding claims 8-9, Tuck et al. disclose that the insulating material is an inorganic material including glass (col. 3, ln. 54-57).
22. Regarding claim 10, Tuck et al. disclose that each electrically conductive particle is substantially symmetrical (col. 4, ln. 4-5).
23. Regarding claim 11, Tuck et al. disclose that each electrically conductive particle is of substantially rough-hewn cuboid shaped (col. 4, ln. 6-7).
24. Regarding claim 12, Figure 4 of Tuck et al. shows the electrically conductive particle having a substantially spheroid shape with a textured surface.
25. Regarding claim 13, Tuck et al. disclose that the conductive particles are each aligned with their longest dimension substantially normal to the substrate (col. 4, ln. 8-11).
26. Regarding claim 14, Tuck et al. disclose the conductive particles having a mutual spacing of 5 to 15 times their longest dimension (col. 4, ln. 12-14).
27. Regarding claim 15, Tuck et al. disclose that each of the conductive particles may be silicon carbide (col. 4, ln. 45-49).
28. Regarding claim 16, Tuck et al. disclose that each of the conductive particles is partially covered in the insulating material (col. 4, ln. 50-53).
29. Regarding claims 17-18, Tuck et al. disclose that the emitter may be applied by screen-printing prepared ink (col. 8, ln. 56-58).
30. Regarding claim 19, Tuck et al. disclose that the material may be applied in a photosensitive binder (col. 8, ln. 52-56).

31. Regarding claim 20, Tuck et al. disclose a step of forming the material by sintering a mixture of particles (col. 5, ln. 1-5).
32. Regarding claim 21, Tuck et al. disclose the insulating material comprising a glass (col. 5, ln. 17-19).
33. Regarding claim 22, Tuck et al. disclose the conductive particle comprising a fiber chopped into a length longer than its diameter (col. 4, ln. 1-3).
34. Regarding claim 23, Figure 6 of Tuck et al. shows the particles being formed by the deposition of the conducting layer upon the insulating layer and subsequent patterning to form isolated islands.
35. Regarding claim 24, Tuck et al. disclose that the particles may be applied by a spraying (col. 8, ln. 58-63).
36. Regarding claim 25, Figure 6 of Tuck et al. shows the conductive particles formed by depositing a layer that crazes into isolated raised flakes.
37. Regarding claim 26, Tuck et al. disclose that the conducting layer comprises a semiconductor (col. 4, ln. 45-49).
38. Regarding claims 27-35, Figures 3-5 of Tuck et al. show random and uniform distribution sites over the field electron emission material.
39. Regarding independent claim 36, Tuck et al. disclose the limitations of independent claim 1, as described above.
40. Regarding independent claim 37, Tuck et al. disclose the limitations of claim 36, as described above, and also disclose means for subjecting the material to an electric field in order to cause the material to emit electrons.



41. Regarding claim 38, Figure 4 of Tuck et al. shows a substrate (17) with an array of emitter patches (19) of the field electron emission material and control electrodes (21) with aligned arrays of apertures, which electrodes are supported above the emitter patches by insulating layers.

42. Regarding claim 39, Tuck et al. disclose that the apertures may be in the form of slots (col. 5, ln. 50).

43. Regarding claim 40, Tuck et al. disclose that the field electron emission device may comprise an electron source (col. 5, ln. 55-57).

44. Regarding claim 41, Tuck et al. disclose that the field electron emission material supplies the total current for operation of the device (col. 5, ln. 58-59).

45. Regarding claim 42, Tuck et al. disclose that the field electron emission material supplies a starting current for the device (col. 5, ln. 60-61).

46. Regarding claim 43, Tuck et al. disclose that the field electron emission device may comprise a display device (col. 5, ln. 63-64).

47. Regarding claim 44, Tuck et al. disclose that the field electron emission device may comprise a lamp (col. 5, ln. 65-66).

48. Regarding claim 45, Tuck et al. disclose that the lamp is substantially flat (col. 5, ln. 67).

49. Regarding claim 46, Tuck et al. disclose an electrode plate supported on insulating spacers in the form of a cross-shaped structure (col. 6, ln. 1-3).

Application/Control Number: 09/555,559  
Art Unit: 2879

50. Regarding claim 47, Tuck et al. disclose that the field electron emission material is applied in patches that are connected in use to an applied cathode voltage via a resistor (col. 6, ln. 4-6).
51. Regarding claim 48, Tuck et al. disclose that the resistor is applied as a resistive pad under each emitting patch (col. 6, ln. 7-8).
52. Regarding claim 49, Tuck et al. disclose a respective resistive pad is provided under each emitting patch such that the area of each resistive pad is greater than that of the respective emitting patch (col. 6, ln. 9-11).
53. Regarding claim 50, Tuck et al. disclose that the emitter material and/or phosphor is/are disposed upon one or more one-dimensional array of conductive tracks which are arranged to be addressed by electronic driving means so as to produce a scanning illuminated line (col. 6, ln. 12-15).
54. Regarding claim 51, Tuck et al. disclose that the field electron emission device may include the electronic driving means (col. 6, ln. 16-17).
55. Regarding claim 52, Tuck et al. disclose that the environment may be gaseous, liquid, solid, or a vacuum (col. 6, ln. 19-20).
56. Regarding claim 53, Tuck et al. disclose a gettering material within the device (col. 6, ln. 21-22).
57. Regarding claim 54, Tuck et al. disclose the gettering material being affixed to an anode of the device (col. 6, ln. 24).
58. Regarding claim 55, Tuck et al. disclose that the gettering material may be affixed to a cathode of the device (col. 6, ln. 25).

59. Regarding claim 56, Tuck et al. disclose that the field electron emission material is arranged in patches and the gettering material is disposed within the patches (col. 6, ln. 26-28).

60. Regarding claim 57, Tuck et al. disclose the field electron emission device comprising an anode, a cathode, spacer sites on the anode and cathode, spacers located at at least some of the spacer sites to space the anode from the cathode, and the gettering material located on the anode at others of the spacer sites where spacers are not located (col. 6, ln. 29-34).

61. Regarding claim 58, Tuck et al. disclose that the spacer sites are at a regular or periodic mutual spacing (col. 6, ln. 40-41).

62. Regarding claim 59, Tuck et al. disclose that a cathode of the device is optically translucent and so arranged in relation to an anode that electrons emitted from the cathode impinge upon the anode to cause electroluminescence at the anode (col. 42-47).

63. Regarding claims 60-61, Tuck et al. disclose that the conducting layer comprises a semiconductor (col. 4, ln. 45-49).

### **Conclusion**

64. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Beetz et al. (WO 97/23002); Chason (WO 91/05361); and Jones et al. (USPN 5663608).

Art Unit: 2879

**Contact Information**

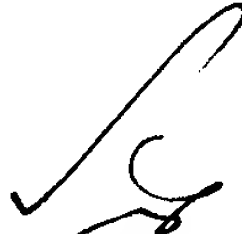

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Quarterman whose telephone number is (703) 308-6546. The examiner can normally be reached on M-F (8-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703) 305-4794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Kevin Quarterman  
Examiner  
Art Unit 2879

kq   
August 20, 2002

   
Vip Patel  
Primary Examiner  
Art Unit 2879